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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,094	07/15/2003	Shohei Sato	29A 3453	8713

7590 04/07/2005

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EXAMINER	
DOUGHERTY, THOMAS M	
ART UNIT	**PAPER NUMBER**
2834	

DATE MAILED: 04/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SM

Office Action Summary	Application No.	Applicant(s)	
	10/620,094	SATO, SHOHEI	
	Examiner	Art Unit	
	Thomas M. Dougherty	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) *29-37* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *703*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-12 and 15, are rejected under 35 U.S.C. 102(e) as being anticipated by Mohr, III, et al. (US 6,429,574; US 6,6,437,487) and under 35 U.S.C. 102(a) as being anticipated by Mohr, III, et al. (US 6,664,717). Mohr, III, et al. show in their respective figure sevens a layered ultrasonic transducer having a first part and a second part which are adjacent to each other, wherein each of the first part and the second part includes: a plurality of first horizontal electrode layers (not numbered) and a plurality of second horizontal electrode layers (not numbered) alternately provided in the vertical direction; a first vertical electrode (not numbered) layer electrically connected with the plurality of first horizontal electrode layers; and a second vertical electrode layer (not numbered) connected with the plurality of second horizontal electrode layers, the first vertical electrode layer included in the first part and the first vertical electrode layer included in the second part being adjacent to each other via a first gap region (not numbered) and having the same polarity, and the ultrasonic transducer includes a first specified

structure formed by the first vertical electrode layer included in the first part, the first vertical electrode layer included in the second part, and the first gap region.

The ultrasonic transducer further comprises a third part (not numbered) adjacent to the second part, the third part including: a plurality of first horizontal electrode layers (not numbered) and a plurality of second horizontal electrode layers (not numbered) alternately provided in the vertical direction; a first vertical electrode layer (not numbered) electrically connected with the plurality of first horizontal electrode layers; and a second vertical electrode layer (not numbered) electrically connected with the plurality of second horizontal electrode layers, the second vertical electrode layer included in the second part and the second vertical electrode layer included in the third part being adjacent to each other via a second gap region (not numbered) and having the same polarity, and the ultrasonic transducer further includes a second specified structure formed by the second vertical electrode layer included in the second part, the second vertical electrode layer included in the third part, and the second gap region.

Each of the first specified structure and the second specified structure is configured symmetrically in the horizontal direction.

The first specified structure and the second specified structure are mutually inverted in the vertical direction. Note that the first gap shows vertical opposed electrodes in an upper region and the second gap shows vertical opposed electrodes in a lower region.

Each of the first part, the second part, and the third part further comprises: a piezoelectric section (not numbered) including the plurality of first horizontal electrode

layers, the plurality of second horizontal electrode layers, and a plurality of piezoelectric layers; a first insulating means (see the gap in the lower right portion of the lower side of the top left-most piezoelectric component) formed on one side of the piezoelectric section for insulating the first vertical electrode layer with respect to the plurality of second horizontal electrode layers; and second insulating means (see the gap in the lower left portion of the lower side of the middle-left piezoelectric component) formed on the other side of the piezoelectric section for insulating the second vertical electrode layer with respect to the plurality of first horizontal electrode layers.

The first vertical electrode layer included in the first part, the second part, and the third part is one of a ground vertical electrode layer (col. 9, ll. 46-49) or a signal vertical electrode layer, the second vertical electrode layer included in the first part, the second part, and the third part is the other one of a ground vertical electrode layer or a signal vertical electrode layer (col. 9, ll. 52-55), the first specified structure is one of a specified structure for ground or a specified structure for signal, and the second specified structure is the other one of a specified structure for ground or a specified structure for signal.

The ultrasonic transducer comprises a plurality of first specified structures and a plurality of second specified structures which are alternately arranged in the horizontal direction.

The ultrasonic transducer is an array transducer, each of the first gap region and the second gap region has a separating slit, and each of the first part, the second part, and the third part is a transducer element forming the array transducer.

Each of the first part, the second part, and the third part is vertically layered and is compounded in the horizontal direction.

The direction of compounding is a first horizontal direction corresponding to a direction in which the first part, the second part, and the third part are arranged.

The direction of compounding is a second horizontal direction which is orthogonal to a first horizontal direction corresponding to a direction in which the first part, the second part, and the third part are arranged.

The direction of compounding is both a first horizontal direction corresponding to a direction in which the first part, the second part, and the third part are arranged, and a second horizontal direction which is orthogonal to the first horizontal direction.

Each of the first part, the second part, and the third part includes a piezoelectric section and a resin section which are coupled in the horizontal direction, the piezoelectric section having a layered configuration (see col. 8, ll. 64-66, where it is noted that the bond may be epoxy bond or other adhesive, e.g. resin) and the resin section being formed by filling. Note that as the components are aligned and held by asperity contact, filling is required. Note also however that the method of forming a device is not germane to the issue of patentability of the device itself. *In re Brown*, 173 USPQ 685, *In re Fessman* 180 USPQ 324.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 13, 14, 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mohr, III, et al. (US 6,429,574; US 6,6,437,487; US 6,664,717). Given the inventions of Mohr, III et al. as noted above, they further show a backing (68) including a signal line (64) provided on the bottom surface side of the array transducer, end parts of the signal lines being arranged on the top surface of the backing so as to correspond to the arrangement of the transducer element.

A ground member (63) and a matching layer (62) are provided on the top surface of the array transducer.

The transducer element comprises at least one piezoelectric section and at least one resin section which are coupled in the Y direction which is orthogonal to the X direction.

They do not show a plurality of transducers with the three parts described above.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a plurality of the transducers with three parts such as are described above, since it ahs been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.,* 193 USPQ 8.

Claims 13, 14 and 16-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mohr, III, et al. (US 6,429,574; US 6,6,437,487; US 6,664,717) in view Barthe et al. (US 6,049,159). Given the inventions of Mohr, III et al. as noted above, they do not show their of the transducer element comprising at least one piezoelectric section and at least one resin section which are coupled in the Y direction which is orthogonal to the X direction. Nor do they show the transducer element comprising a plurality of piezoelectric sections and a plurality of resin sections which are coupled in the X direction and in the Y direction which is orthogonal to the X direction.

The transducer element is compounded in one of a first horizontal direction and a second horizontal direction.

The transducer element is compounded in both a first horizontal direction and a second horizontal direction.

They do not show an array transducer which includes a plurality of transducer elements, wherein each of the transducer elements comprises at least one piezoelectric section and at least one resin section which are coupled in the horizontal direction, the at least one piezoelectric section including a plurality of piezoelectric layers and a plurality of horizontal electrode layers which are laminated in a predetermined order in the vertical direction and a pair of vertical electrode layers which are electrically connected to the plurality of horizontal electrode layers so as to establish a predetermined connection relationship with the plurality of horizontal electrode layers, the at least one resin section being formed as a filler layer having continuity in the vertical direction, and each of the transducer elements is vertically layered and

is compounded in the horizontal direction.

They do not show the at least one piezoelectric section further comprising a pair of vertical insulating layers provided between both side surfaces of a piezoelectric section body formed of the plurality of piezoelectric layers and the plurality of horizontal electrode layers and the pair of vertical electrodes.

Barthe et al. show (fig. 2) a transducer array with a plurality of elements(110A-C) which have dimensions in X and Y horizontal directions and which are compounded by a resin (122) in both vertical and horizontal directions.

Barthe et al. does not show each of the transducers comprising three parts.

It would have been obvious to one having ordinary skill in the art to use the resin in both vertical and horizontal directions as shown by Barthe et al. in the devices of Mohr, III et al. at the time of their inventions, because such a design results in an "enhanced bandwidth without excessive loss of sensitivity ...". See the ABSTRACT of Barthe, III et alia.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Any remaining prior art cited reads on at least some aspects of the claimed invention.

Direct inquiry to Examiner Dougherty at (571) 272-2022.

tmd

tmd

March 10, 2005

TOM DOUGHERTY
PRIMARY EXAMINER